ESTIMATES COMMITTEE Question Taken on Notice

Date:	19 June 2018			
Subject:	Environment grant to the Motor Trades Association			
From:	Mr Gerry Wood			
То:	Hon. Lauren Moss			
Agency:	Department of Environment and Natural Resources			
Number:	7.6			
Question:	What was the result of the environment grant to the Motor Trades Association for the study of end of life tyres.			

Answer:

In 2016-17, \$19 565 was issued to the Motor Trade Association of the NT (MTANT) to conduct a review of the volume of End of Life Tyres (EOLT) generated across the Northern Territory (NT) and the extent to which those EOLT are reused, recycled or disposed. The review also considered the market for EOLT in the NT and identification of opportunities to improve recycling of EOLT.

The MTANT is the peak body for the automotive industry and seeks to find new opportunities for EOLT in the NT, improvement of environmental outcomes and build stronger local industry and employment opportunities.

A final report was produced (attached). According to the report, 5.04 tonnes of ELOT were generated in the NT in 2015-16. Around 45% of those were truck tyres, 35% large off road tyres and 20% passenger tyres. More than 70% of EOLT generation occurred in the Greater Darwin and Alice Springs regions with the 29% generated in regional and rural areas.

Less than 2% (70 tonnes) is recycled locally with 10% exported for energy recovery. The remaining 88% is reportedly disposed to landfill or went to unknown destinations (e.g. dumping, burning, stockpiling, illegal exports).

The report describes a number of barriers to the expansion of the reuse and recovery of EOLT in the NT, including lack of infrastructure and costs associated with providing that infrastructure, transport costs (particularly from remote areas), cheaper imports and limited local markets.

The report provides a number of recommendations in terms of regulatory reforms to restricted tyres going to land fill and levies on disposing tyres, consideration by industry on alternative collection models (with a focus on economies of scale) and greater collaboration across the entire tyre industry in Australia.

National Product Scheme for Tyres

The NT is part of the national Product Stewardship Scheme for Tyres established under the Commonwealth's *Product Stewardship Act*. A review of the effectiveness of the product stewardship schemes across Australia is currently underway.

Anecdotal feedback to date indicates that there is a general concern that the product stewardship scheme for tyres is not effective and that additional regulatory measures (e.g. recyclable targets) are required to generate industry participation in the scheme. A report on the review of the product stewardship scheme is likely to be presented to Australian Environment Ministers later in 2018 for consideration.

End of life tyres in the Northern Territory

THE PARTY

reincarnate strategic environmental consultants

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Motor Trades Association (NT) and EPA NT



by Reincarnate Consulting



MOTOR TRADES ASSOCIATION (NT) AND NORTHERN TERRITORY EPA

END OF LIFE TYRES IN THE NORTHERN TERRITORY

Final Report

Author	Matt Genever
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Reference	RI004-01-FR1

7 April 2017

Date

This report has been prepared for the Motor Trades Association (NT) and NT EPA under the agreement dated 24 January 2017. Reincarnate (ABN: 30 311 909 273) cannot accept any responsibility for any use or reliance on the contents of this report by any third party.

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EXECUTIVE SUMMARY

End-of-life tyres (EOLTs) present a persistent management challenge in Australia with limited domestic recycling and low recovery rates. The most recent national data suggests that more than 56 million equivalent passenger units (EPUs) reached their end-of-life in 2015-16, with just 10% recycled locally and a further 27% exported for energy recovery in international markets. The remaining 63% were disposed to landfill or went to unknown fates. Given tyres contain high value steel and rubber this represents a considerable missed opportunity.

The Motor Trades Association NT (MTANT) is the peak body for the automotive industry and seeks to find new opportunities for EOLTs in the Northern Territory (NT), both to improve environmental outcomes and to build stronger local industries and employment opportunities. MTANT received a grant from the NT Environment Protection Authority (NT EPA) through the NT EPA Project Grants funding stream, to undertake a data study into the stocks and fates of EOLTs in the NT. Reincarnate has been appointed to undertake the study which is presented in this report.

Key Findings

More than 5,000 tonnes or around 630,000 EPUs of EOLTs were generated in the NT in 2015-16. Around 45% of those were truck tyres, with large off-the-road (OTR) tyres and passenger tyres making up 35% and 20% respectively.

More than 70% of EOLT generation occurred in Greater Darwin and Alice Springs, with the remaining 29% being generated in regional and rural areas. EOLT generation by local government area is presented below:



5,036 tonnes or 629,875 of EOLTs were generated in NT in 2015-16





Of the 5,039 tonnes of EOLTs generated in NT, less than 2% (around 70 tonnes) were recycled locally with a further 10% exported for energy recovery. The remaining 88% were disposed to landfill or went to unknown fates which include dumping, burning, stockpiling and unreported exports. This represents one of the lowest recycling rates for EOLTs of all states and territories in Australia.

At present, the tyre recycling industry in NT is constrained with limited options for tyre retailers and local governments. Most councils reported that they accept EOLTs at transfer stations and landfill sites with this material being stockpiled or sent directly to landfill.

Barriers to expansion

The key barriers restricting further recovery of EOLTs in NT include:

- 1. Regulation The current regulatory framework does not encourage the diversion of EOLTs from landfill. Cheap and easy access to landfilling undermines the business models for resource recovery.
- Transport costs EOLT generation is closely linked to population. Communities in NT are dispersed and there is low population density meaning that transport distances required to aggregate the required volumes are large. This adds cost and weakens the case for recovery.
- 3. Infrastructure costs There are barriers to entry for new recyclers wanting to process tyres into crumb rubber and granule. Infrastructure costs and maintenance costs and high presenting a challenge to new players.
- 4. Imports of cheap rubber Current recyclers are being impacted by imports of cheaper crumb rubber from international jurisdictions. There is evidence of imported rubber being used for manufacturing of soft-fall matting in Darwin.
- Limited local markets Currently, there are limited markets for tyre-derived products in the NT and new markets will be required to underpin future recycling.

Recommendations for increasing resource recovery of EOLTs in NT

No	Recommendations			
1	Strengthen the regulatory framework for EOLT management			
	The viability of EOLT recovery and recycling in NT will be difficult unless changes are made to the regulatory framework that restrict access to landfilling. The most obvious mechanism would be to ban the landfilling of whole tyres or to impose a fee or penalty for landfilling of whole tyres.			
	It is recommended that NT EPA, working in consultation with tyre retailers, collectors and recyclers, consider implementing tighter regulatory controls on the disposal of tires to landfill in NT			
2	Implement a levy – refund scheme to encourage recycling			
	There is scope to employ market based mechanisms to incentivise recycling. A levy – refund scheme would support recycling and build strong local markets for recycled products.			
	It is recommended that NT EPA, working in consultation with tyre retailers, collectors and recyclers, investigate a levy – refund scheme for EOLTs in NT to ensure appropriate collection and recycling			



- Energy recovery
- Legal stockpiles
- Landfill / unknown
- Recycling

Fates of EOLTs in NT by percentage, 2015-16



3	Trial new collection and consolidation models to improve economies of scale
	Economies of scale are required to underpin viable collection models. There is an opportunity to trial new
	collection and consolidation models that generate local employment as well as drive additional recycling.
	It is recommended that new collection and consolidation models for EOLTs in NT be trialled through pilot
	programs. These models could include elements of local employment and training to improve the overall business
	case for recovery
4	Encourage greater participation in TSA across the industry
	The existing national stewardship scheme for EOLTs presents an opportunity to support industry growth and
	professional development. NT has a low participation rate in the scheme and there is an opportunity to encourage
	greater involvement.
	It is recommended that the NT Government and the Local Government Association of NT, look at how existing
	procurement policies can be amended to encourage participation in the National Tyre Product Stewardship
	Scheme as implemented by TSA
5	Leverage existing market development work underway nationally
	There is an opportunity for NT to link into work being undertaken on a national market development strategy for
	use tyres. New opportunities have been identified and will be progressed over coming years. Where feasible, NT
	can look to implement the findings of the strategy and generate new markets for EOLTs
	It is recommended that the NT Government look to align key objectives and opportunities for TDPs with the
	current national market development strategy which is underway. This will be led through discussions at the
	Meeting of Environment Ministers (MEM) in June 2017 and NT can look to position itself at this stage
6	Develop new, local markets for TDPs in NT
	There are several opportunities for new markets for TDPs in the NT which should be pursued in line with the
	national strategy being developed, including:
	- Use of tyre-derived aggregate in civil engineering applications such as landfill drainage and lightweight fill
	- Use of whole tyres in civil engineering, such as retaining walls and subbase stabilisation
	- Use of crumb rubber in road sprayed seals, particularly in higher traffic roads
	- Expansion of existing markets for soft-fall surfacing and matting
	t is recommended that the NT Government, working closely with industry, pursue new markets for TDPs in the
	territory, and support the development of standards and specifications for new uses (for instance as landfill
	drainage aggregate or daily cover). Similarly, both NT Government and Local Government Association of NT,
	should look to promote the use of locally manufactured TDPs in applications where they are equal on price,
	performance and quality



1 INTRODUCTION

Australia generates more than 56 million waste tyre equivalents (EPUs or equivalent passenger units) every year of which only 10% are currently recycled¹. The remainder are sent to landfill, exported as a fuel replacement or illegally dumped or stockpiled. Traditionally, Australia has been poor at managing the risk associated with end-of-life tyres (EOLT), particularly the dumping or stockpiling of tyres which constitutes a significant fire risk to the community.

In 2014, the tyre industry, working closely with government at all levels, established Tyre Stewardship Australia (TSA), a not-for-profit company charged with delivering the National Tyre Product Stewardship Scheme (the Scheme). The Scheme, which is ostensibly a certification system, seeks to improve local markets for tyre recycling, remove poor operators from the market and invest in local markets for recycled tyre products.

Whilst the emergence of TSA is benefiting the industry through research and development and compliance activities, more localised issues associated with illegal dumping and poor markets for recycled tyre products are far from being addressed. This is a critical concern in the NT where poor economies of scale and large transport distances make the collection and recycling of end-of-life tyres even more difficult.

The Motor Trades Association (NT) is the peak industry body for the automotive industry in the Northern Territory. MTANT works with industry and government to support its members, which include tyre retailers, and to advance the automotive industry. The issue of waste tyres and automotive waste in general is a key topic of concern and MTANT is keen to see a viable tyre recycling industry evolve in the NT to ensure that waste tyres are being managed appropriately and are seen as a valuable commodity.

MTANT, working with EPA NT through the 'Project Grants' program, has engaged Reincarnate to undertake a detailed data and market study of the EOLT industry in NT. The project aims to:

- Provide up to date, local NT data on the generation and fates of EOLT
- Identify current market barriers that inhibit growth in the tyre recycling sector
- Identify opportunities for market expansion
- Provide recommendations on how those options may be realised.

This report provides the findings of the study.

¹ REC 2017. Unpublished data developed for the national market development strategy for used tyres



2 POLICY AND REGULATION

In most jurisdictions in Australia, tyres are a regulated waste and operators in the space require some form of licencing and approval. This section provides an overview of the policy and regulatory environment for EOLT relevant nationally and to the NT. Policy surrounding management of EOLT has been explored in several previous reports² and will be touched on only briefly in this project.

2.1 National Policy

The National Waste Policy (NWP) was released in 2009 with the intent of providing a 10-year strategic direction for waste management in Australia. Specifically, the NWP aims to improve efficiency and cohesion between state and nationally applied waste regulations to improve resource recovery to 2020.

Whilst the NWP does not specifically relate to EOLTs, which are broadly administered at state and territory level³, a central principle of the policy relates to the application of product stewardship as a mechanism for increasing recycling of problematic materials. Product stewardship is an approach which recognises that all participants in the product chain (as represented in Figure 1) have a responsibility to ensure that the product can be appropriately managed at end of life.

In Australia, the administration of product stewardship programs falls under the *Product Stewardship Act 2011* (the "PS Act") which provides a framework for regulatory, co-regulatory and voluntary stewardship arrangements to exist.



Figure 1 Product chain for end-of-life tyres in relation to product stewardship approaches

² See Stocks and fate of end-of-life tyres Hyder 2015

³ See latter sections on the link between EOLTs and national hazardous waste reporting



The management of EOLT in Australia has been a key focus of activity under the PS Act which culminated in the development of a voluntary, industry-led scheme administered by Tyre Stewardship Australia.

The Federal Government is required to undertake a full review of the PS Act at its 5-year anniversary, which was triggered in August 2016. The review is likely to commence in 2017 and will have a strong focus on current stewardship arrangements, including their impact both nationally and at state and territory level.

2.2 Tyre Stewardship Australia (TSA)

In 2014, representatives from industry and government launched TSA, a not-for-profit company established to deliver the National Tyre Product Stewardship Scheme (the Scheme). The Scheme, which is a voluntary stewardship scheme, aims to:

- Reduce in the number of tyres not going to an environmentally sound use
- Enhance the Australian recycling industry
- Develop sustainable markets for recycled tyre products
- Improve conditions for tyre collectors and recyclers
- Increase consumer awareness of the impacts of end-of-life tyre disposal.

Effectively, the Scheme is an accreditation program which seeks to promote those tyre collectors and recyclers in the industry that have committed to responsible end-of-life management of tyres. This is achieved through:

- Accreditation and promotion of participants in the Scheme
- A detailed audit and compliance program to ensure best practice is being achieved
- An industry development program aimed at improving the capability and capacity of the tyre recycling sector
- Investment in research and development to identify new and expanded markets for tyre derived products in Australia.

To date, more than 1,200 organisations are accredited under the Scheme, including the majority of tyre collectors and recyclers⁴. The launch of full audit and compliance activities by TSA has been an important step in assisting the industry in addressing critical risks related to tyre storage and fire management. In 2016, to assist the industry in continuous improvement, TSA released two best practice guidelines which provide support in areas such as fire and emergency management, tyre storage and the management of exports⁵.

Perhaps the most important role for TSA, at least from the perspective of the tyre recycling industry, lies in unlocking new markets for tyre-derived products. The release of the Tyre Stewardship Research Fund, which seeks to support early-stage research and development projects, has seen more than \$1.5 million committed to market development projects⁶. Focus areas for investment include road construction, civil construction, rail infrastructure and uses of advanced polymers.

As of February 2017, there are 18 TSA accredited tyre retailers but no TSA accredited tyre collectors or recyclers based in the NT⁷.

⁴ Tyre Stewardship Australia Annual Report 2015/16

⁵ Tyre Stewardship Australia industry consultation

⁶ Tyre Stewardship Research Fund

⁷ Note that Tyrecycle, a TSA accredited tyre collector and recycler services the NT via a subcontract arrangement



2.3 Hazardous waste regulations

2.3.1 Hazardous Waste (Regulation of Exports and Imports) Act 1989

Australia is a signatory to the Basel Convention on the *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal 1992*, which sets a framework to monitor the international movement of hazardous wastes. Domestically, this is managed via the *Hazardous Waste (Regulation of Exports and Imports) Act 1989* (the 'Haz Waste Act'), which regulates and tracks the movement of hazardous wastes in and out of Australia.

Whilst EOLTs are not a listed waste in Basel (Annex 1) or under the Haz Waste Act, Australia reports annually on the transboundary movements of tyre waste. The Basel Convention provides specific guidance related to tyres, recognising that despite not being a hazardous waste, tyres contain hazardous materials and can have significant impacts on environmental and human health when not managed effectively. International guidance on the management of EOLTs, including export and use as a fuel, is provided in the *United Nations Technical Guidelines*.

2.3.2 National Environment Protection (Movement of Controlled Waste between States and Territories) Measure 1998

The National Environment Protection (Movement of Controlled Waste between States and Territories) Measure 1998 (Controlled Waste NEPM) provides a framework for managing the movement of controlled wastes between states and territories. The NEPM relates only to interstate movement of hazardous waste. Tyres are listed as a controlled waste under Schedule A (List 1), which means all states and territories must have suitable systems in place for tracking the interstate movement of EOLTs.

2.3.3 OECD Decision Regulations

To support its member countries in meeting the obligations of the Basel Convention (through the harmonised OECD Decision C(2001)107), the Organisation for Economic Cooperation and Development (OECD) has published a Guidance Manual for the Control of Transboundary Movements of Recoverable Wastes. The guideline lists waste tyres under the "green control procedure", which requires that the material must be:

"destined for recovery operating within a recovery facility which will recover them in an environmentally sound manner according to national laws, regulations and practices".

2.4 Australian Customs Regulations

The Australian tyre recycling industry exports significant quantities of EOLTs as whole tyres, baled tyres and shredded tyres (as tyre-derived fuel (TDF)). This material is predominantly used for energy recovery in cement kilns, paper and pulp production and pyrolysis facilities.

The export of goods from Australia falls under the *Customs Act 1901* which provides a legislative framework for exports including the prohibition and setting of requirements and conditions. It is a requirement of the Act that goods being exported from the country be reported to the Department of Immigration and Border Protection.

There are specific reporting guidelines for the export of goods from Australia and these are outlined in the *Export Control Manual.* The manual includes a process for obtaining an Export Declaration Number (EDN) and the numbering conventions which apply to shipments under the Australian Harmonised Export Commodity Classification (AHECC).



In recent years, the local tyre recycling industry has been negatively impacted by the import of cheap crumb rubber from countries where a subsided collection and recycling program exists (for example Portugal). Reports suggest a discount of around 30% on the rates offered by Australian crumb rubber producers⁸.

2.5 Climate change and alternative energy policy

Tyres have a calorific value of around 32-34 MJ/kg which makes them an attractive fuel or supplementary fuel at their end-of-life. Whilst most of this market remains offshore (for example, the export of TDF for cement kilns) the domestic focus on alternative energy and emissions reductions has opened up further opportunities for EOLTs.

The recently established Australian Renewable Energy Agency (ARENA) seeks to increase the supply of renewable energy in Australia and to develop more affordable renewable energy solutions⁹. As part of its funding program, ARENA has reportedly financed a project to investigate the feasibility of processing large, OTR (off-the-road) mining tyres into biofuels using pyrolysis and gasification technology. The successful application of such technology could benefit both Australia's management of EOLTs and provide a new biofuels industry.

In addition, the Clean Energy Finance Corporation (CEFC) aims to facilitate a transformation toward cleaner, more efficient modes of energy generation. Investing in commercial energy projects, CEFC looks for scalable and replicable models¹⁰. The natural rubber in tyres is renewable and when used as fuel EOLTs burn more efficiently than coal, suggesting the utilisation of EOLTs in energy generation may be considered under the CEFC remit.

In 2016, CEFC indicated it would prepare an internal position paper regarding options for integrating EOLT projects into its investment portfolio. The paper has not been released publicly at this stage.

2.6 Meeting of Environment Ministers (MEM)

Since 2015, State Environment Ministers have maintained a focus on working toward solutions for waste tyres, recognising that some markets would benefit from a national approach in order to gain maximum uptake.

In December 2015, a Meeting of Environment Ministers (MEM) endorsed a national project to develop a market development strategy for used tyres to be co-led by Queensland and Victoria and financially supported by the partner jurisdictions Queensland, Victoria, New South Wales and Western Australia in collaboration with Tyre Stewardship Australia. This project is currently underway and will examine state and territory markets and identify opportunities at national, state and local level.

2.7 Carbon Risk and Alternative Energy

There is some federal level activity around end-of-life tyres in the area of alternative energy and carbon management policy. The Federal Government has recently agreed to continue funding for both the Australian Renewable Energy Agency (ARENA) and the Clean Energy Finance Corporation (CEFC). Both of these agencies are looking at energy recovery from tyres as a potential area of investment, with ARENA pledging funding to the Downer linked project (formerly OTRcycle) looking at pyrolysis of mining tyres.

Similarly, the CEFC has drafted a position paper on how and where energy recovery from EOLT might fit its investment portfolio, potentially in the area of energy efficiency or reduced emissions technology, however this paper has not been released for public comment. This space should be carefully monitored by Tyrecycle to ensure it is aware of potential changes that could impact the market.

⁸ Pers comm, confidential industry sources

⁹ Arena website

¹⁰ CEFC website



3 TYRE RECYCLING IN AUSTRALIA

The national market for tyre collection and recycling is diverse and wide-spread, ranging from small local operators to large national player. In general, the market is typified by tyre collectors and recyclers operating at state level, collecting tyres across a 100 – 200km radius and producing tyre-derived fuel or baled tyres for export.

Tyres are characterised by "tyre type" and have three main classifications – passenger, truck and off-the-road (OTR) tyres. They are measured in equivalent passenger units or EPUs, which is a standard measure of 1 passenger tyre (around 9.5kg new and 8kg when used). A description of tyre classification, type and EPU ratio is presented in Table 1

Tyre classification	Type of tyre		
New tyres			
Passenger	Motorcycle	0.5	
	Passenger Car	1	
Truck	Light Truck/SUV	2	
	Truck small (17.5" & 19.5")	3	
	Truck large (20" & 22.5")	5	
OTR	Small Specialty/Ag (skid steer, forklift 8"-15", front tractor & backhoe 15" to 18")	3	
	Medium Specialty/Ag (20" – 30")	5 to 8	
	Large Specialty Ag (32" and above)	20-30	
	Small Earthmover (24" – 25")	50	
	Medium Earthmover (29" – 35")	100	
	Large Earthmover (above 35")	200	
Recycled tyres			
Passenger	Motorcycle	0.5	
	Passenger	1	
Truck	Light Truck	2	
	Truck	5	
	Super Single	10	
OTR	Solid small (up to 0.3m high)	3	
	Solid medium (>0.3m up to 0.45m)	5	
	Solid large (>0.45 m up to 0.6m)	7	
	Solid extra-large (> 0.6m)	9	
	Tractor small (up to 1m high)	15	
	Tractor large (>1m up to 2m)	25	
	Fork lift small (up to 0.3m high)	2	

Table 1 Tyre classification, type and EPU ratio¹¹

¹¹ TSA 2014. 'Tyre Product Stewardship Scheme Guidelines' *Tyre Stewardship Australia* Appendix 1



Fork lift medium (>0.3m up to	4
Fork lift large (>0.45m up to	6
Grader	15
Earth mover small (up to 1m	20
Earth mover medium (>1m up 1.5m)	50
Earth mover large (>1.5 up to 2m)	100
Earthmover extra-large (>2m up to 3m)	200
Earthmover giant (>3 up to 4m)	400
Bobcat	2

Australia-wide it is estimated that more than 60% of all EOLTs generated are still landfilled (including passenger and truck tyres sent to waste landfills and large OTR tyres buried directly at mine sites (referred to as "onsite management")), stockpiled or illegally dumped¹². This represents a significant missed opportunity both in terms of recovered commodities and the inefficient use of valuable landfill airspace. The market for materials recycling – that is the production of recycled rubber products such as crumb rubber and granule – remains significantly constrained, accounting for around 5% the total market¹³.

The EOLT market can be described in three distinct phases as shown in Figure 2.

Figure 2 Overview of the Australian EOLT market



This chapter provides a brief overview of the national tyre recycling market which is important in setting the local context for NT.

¹² Stocks and fate of end-of-life tyres Hyder 2015

¹³ Stocks and fate of end-of-life tyres Hyder 2015



4 THE EOLT MARKET IN NORTHERN TERRITORY

In establishing the size and scope of the EOLT market in the NT for this study, Reincarnate has collected primary data and secondary data from a number of sources:

- > Data was collected from the existing tyre collectors and recyclers on EOLT recovery, recycling and end markets
- Data related to EOLT sales, in-use and generation was extracted from the most recent national data set developed by Randell Environmental Consulting, Reincarnate and EnvisageWorks (referred to as 'REC 2017')
- Extrapolated landfill data used for National Waste Data Set reporting was provided by NT EPA
- Data and qualitative information was captured from a survey of tyre retailers and local government authorities as follows:
 - Local Government Survey 8 responses
 - Tyre Retailer Survey 12 responses

4.1 Regulatory context

The Waste Management and Pollution Control Act (the Act) sets a framework for the management of waste and recycling activities in the NT; the objectives of the Act are¹⁴:

- a) to protect, and where practicable to restore and enhance the quality of, the Territory environment by:
 - i. preventing pollution;
 - ii. reducing the likelihood of pollution occurring;
 - iii. effectively responding to pollution;
 - iv. avoiding and reducing the generation of waste;
 - v. increasing the re-use and re-cycling of waste; and
 - vi. effectively managing waste disposal;
- b) to encourage ecologically sustainable development; and
- c) to facilitate the implementation of national environment protection measures made under the National Environment Protection Council (Northern Territory) Act.

Tyres are a listed waste under Schedule 2 of the Waste Management and Pollution Control (Administration) Regulations which means that activities involving the collection, transport, storage, recycling, treating or disposing of tyres require an environmental protection licence.

However, unlike most jurisdictions in Australia, the landfilling of whole tyres is allowed in the NT and the lack of a landfill levy means that there are limited drivers to encourage greater diversion from landfill

¹⁴ NT Gov. 'Waste Management and Pollution Control Act Section 5 Objectives pp8



4.2 EOLT Consumption and in-use in NT

The "consumption" of EOLTs refers to new tyre sales across passenger, truck and OTR tyres. Once sold and being used on a vehicle, tyres are then referred to as "in-use"

Consumption is a product of tyre sales data, collected through industry reports and ABS figures on imports¹⁵. Consumption of new tyres in the NT for 2015-16 is estimated to be around 5,800 tonnes or 725,000 EPUs, which is presented by tyre type in Figure 3.



Figure 3 Tyre consumption in the NT in 2015-16 (new tyre sales, in tonnes) by tyre type

National data shows that new tyre sales in Australia have grown around 16% since 2007-08¹⁶. Most of this market growth has come from passenger tyres which have increased by some 50%, with a significant offset coming from a 30% decline in OTR tyres as the resources and commodities sector has slowed¹⁷.

In-use tyres in the NT is estimated at around 7,000 tonnes or 875,000 EPUs.

Nationally, tyre sales and tyre stocks are predicted to increase by 14% and 17% respectively over the next 10 years¹⁸.

4.3 EOLT Generation in NT

The generation of EOLTs is calculated as a product of tyre consumption (how many tyres are sold into the market), in-use statistics (how many tyres are currently on vehicles) and the average life expectancy of tyre types (how long do tyres remain "in-use").

In 2015-16, NT generated some 5,039 tonnes or 629,875 EPUs of end-of-life tyres as is presented in Table 2 and Figure 4. The largest contributor to EOLT arisings in the NT are truck tyres which make up around 45% of generation. A further 35% are OTR

¹⁵ There are no tyre manufacturers operating in Australia, all new tyres are imported and thus picked up through import data

¹⁶ Data from Hyder 2012 and REC 2017

¹⁷ Data from Hyder 2012 and REC 2017

¹⁸ REC 2017



Table 2 EOLT generation in the Northern Territory¹⁹

Tyre type	Tonnes	EPUs
Passenger	1,236	154,500
Truck	2,138	267,250
OTR	1,665	208,125
TOTAL	5,039	629,875

Figure 4 Breakdown of EOLT generation in NT by tyre type



The generation of EOLTs strongly mirrors population, with the majority coming from areas of high population and urbanisation. EOLT generation by local government area is presented in Figure 5. The population in the NT is largely dispersed with low population density outside of Alice Springs and the greater Darwin region. Figure 6 indicates that more than 70% of EOLT arisings in the NT come from the Alice Springs and Darwin population centres.

¹⁹ EOLT data derived from unpublished modelling in REC 2017.





Figure 5 Breakdown of EOLT generation in NT by local government area (based on NT per capita arisings)

Figure 6 Percentage of EOLT generation in Greater Darwin, Alice Springs and regional NT (based on NT per capita arisings)





4.5 Fates of EOLTs in NT

The fate of an EOLT refers to its final destination or use when it reaches the end of its useful life. The primary fates for EOLTs in Australia are as follows:

Fate	Destination	Description	
Reuse	Domestic	Predominantly truck tyres which are locally retreaded and a small percentage of second hand tyres for resale	
	Export	Good condition used tyres exported for reuse or retreading	
Recycling	Domestic	Tyres that are recycled into commodities for local markets	
Energy recovery	Export	Tyres that are exported, either baled or shredded, used for energy recovery in cement kilns, industrial boilers and paper and pulp facilities	
Known stockpiling	Domestic	Tyres have been recovered for recycling but are stockpiled awaiting processing	
Landfilling	Domestic	Tyres legally disposed to landfill, either whole or shredded	
Unknown fates	Unknown	Tyre for which the fate is unknown, including illegal dumping, burning, illegitimate stockpiling, unreported exports, licensed and unlicensed landfilling	

The fates of EOLTs in NT have been calculated using national data and primary state level data collected through data surveys²⁰ and are presented in Table 3

Fate	Passenger	Truck	OTR	Total
Reuse	-	-	-	-
Recycling	30	36	-	67
Energy recovery	490	16	15	522
Legal stockpiles	6	3	13	22
Landfill / unknown	710	2,083	1,636	4,428
TOTAL	1,236	2,138	1,665	5,039

Table 3 Fates of EOLTs in the NT by tyre type, 2015-16

 $^{\rm 20}$ As part of REC 2017 and data collected by Reincarnate for this project





Figure 7 Fates of EOLTs in NT by tyre type, 2015-16

The data indicates that the some 4,428 tonnes or 88% of EOLTs generated in NT is disposed to landfill or goes to unknown fate, which represents a significant lost opportunity. A further 10% is exported for energy recovery (via Adelaide) with some minor onsite stockpiling occurring.

Local recycling is a small part of the current market with around 70 tonnes or 1.3% recovered for recycling. This suggests there is considerable scope to build new markets and new industries to capture the lost resource. Opportunities for achieving this will be explored in the next section of the report.



Figure 8 Fates of EOLTs in NT by percentage, 2015-16



4.6 Industry and council trends related to EOLTs in NT

To support the collection of EOLT data for this project, a survey of local governments and tyre retailers across the NT was undertaken.

Tyre retailers

The following key findings were noted from the survey of tyre retailers (total of 12 responses):

- 1. At present, the market have few options in terms of tyre collectors and recyclers in the NT with only two listed tyre recyclers in the territory. Some tyre retailers have purchased their own tyre shredders in order to process EOLTs before disposal to landfill.
- 2. Of those retailers who are serviced by a tyre collector, 60% of respondents did not know where their EOLTs went once collected.
- 3. Consumer awareness or interest in where their tyres go once removed from vehicles remains low with tyre retailers reporting that customers rarely ask where scrap tyres end up (around 36% on a sliding scale).
- 4. Retailers surveyed reported high awareness of Tyre Stewardship Australia with 80% of respondents having heard of TSA. However, participation rates are low with 60% reporting they were not part of the scheme (another 20% listed "unsure" as a response).

Tyre type	Low range	High range
Passenger	\$3.00	\$8.00
4x4	\$6.29	\$8.80
Light truck	\$8.00	\$17.00
Truck	\$15.00	\$19.80

5. Customer charges quoted by tyre retailers during the data survey are (per unit):

Local government survey

- 1. Around 90% of councils surveyed accept EOLTs at transfer stations and landfill sites.
- 2. Some councils do not charge for disposal of EOLTs, however the typical price for disposal is around \$10/unit at most sites.
- 3. Councils report that most EOLTs are landfilled whole or are stockpiled on site, with a small number being reused by one council as retaining walls. When asked why stockpiling was occurring, councils cited a lack of collection options and the need to aggregate enough volume to warrant tyre collection.
- 4. More than 85% of councils surveyed did not know of a tyre recycler that serviced their area.
- All councils surveyed indicated illegal dumping of tyres as an area of concern with more than half noting council is required to collect dumped tyres at its own cost with annual clean-up costs as high as \$10,000 per annum.
- 6. One council noted that:

"Remote localities need to have a way of recycling tyres from communities that is cost effective, preferably a program that can be conducted on community and possibly provide employment opportunities for locals."



5 MARKET ANALYSIS OF EOLTS IN NT

This section of the report seeks to provide an overview of the current market for EOLTs in NT, and perhaps more importantly, provides an overview of future opportunities for greater resource recovery in the sector. Given the data suggests current recovery and recycling is extremely low in NT, we have focused much of this section on potential products and their applications.

To conclude the section and the report, recommendations have been made for government and industry to consider in moving forward.

5.1 Tyre-derived products and their applications

In order to understand the current and future potential markets for EOLTs in NT, it is important to explore the types of commodities and products that are commonly produced and their typical applications. These are referred to as tyre-derived products or TDPs.

Tyre recycling is dominated by traditional methods which use a series of shredders, screens and granulators to separate materials and reduce the size of the rubber outputs based on market needs. A typical tyre recycling facility uses the following model:





The TDPs from this typical reprocessing model and their common applications are presented in Table 4.

TDP	Typical application	Approx.
		value (\$/t)
Whole tyres	Whole recovered tyres (commonly referred to as "casings") are unprocessed tyres which can be sold locally or exported for second hand reuse or retreading. There are limited markets for casings in Australia, apart from the retreading of truck casings. There is a strong casings export market from Australia into Asia and Africa.	\$100 tonne
Baled tyres	Whole tyres are compressed using a hydraulic bale press and then bound with high tensile wire to form a block shape. Baling is a fast process that can greatly improve efficiencies for both interstate and international transport. Tyre balers are relatively cheap to purchase and maintain and the barriers to entry for this market are therefore relatively low.	-\$70 tonne
Shredded tyres	Shredded tyres are exported in high quantities from Australia as tyre-derived fuel (TDF). TDF generally comprises a set size of shredded tyre (around 50mm) which is used as a coal replacement in cement kilns, industrial boilers and paper and pulp facilities. Around 20% of all EOLTs generated in Australia are exported as TDF.	-\$70 tonne
Granule	Rubber granulate or granule is produced via further shredding and screening plus the removal of steel via magnets. This is a relatively uniform product of around 2mm – 15mm (depending on the use) and is commonly used in the production of recycled rubber matting, underlays and soft-fall playground surfaces.	\$300 tonne
Buffings	Buffings are high grade rubber that are shaved off the remaining tread of truck tyres during the retreading process. They are long and thin (around 10 – 20mm in length) and have typically low contamination rates. Buffings are used in equestrian surfacing, matting and other soft-fall surfaces.	\$300 tonne
Crumb rubber	Crumb rubber is a highly refined product that is produced via a three-stage grinding or milling process to separate rubber, fabric and steel. This makes up a considerable portion of the domestic market for TDPs in Australia and has a number of high value uses including road surfacing, polymer replacements, tile adhesives and in the production of explosives.	\$600 tonne
Steel	Steel is removed via magnets at a number of stages of the shredding and grinding process. The output is very thin slivers of steel that resemble steel wool. This is sold to scrap metal recyclers on the open market and is used in production of new steel billet for steel rods.	\$90 tonne

Table 4 Tyre-derived products from traditional recycling plants and their common applications



It should also be noted that new processing technologies for EOLTs in the form of bespoke energy from waste (EFW) facilities using pyrolysis and gasification are currently emerging. Planning and development of these types of facilities is underway in Victoria, NSW, SA, QLD and WA, suggesting they may have a considerable impact in the market in coming years.

Essentially, this type of infrastructure seeks to use thermal processing in low or no oxygen environments to break tyres down into fuel, gas and carbon. The products and their applications are thus different, and are presented in Table 5.

IDP	Typical application	Approx. value (\$/t)
Syngas	When tyres are heated in low or no oxygen a synthetic gas (or syngas) is produced. This is combustible and is commonly used to power the facility due to high energy requirements for pyrolysis and gasification.	NA
Fuel oil	The main product coming from this technology is fuel at varying grade and quality. A condenser collects the vapour after the tyre has been processed and this is then turned into a fuel oil. In other countries where pyrolysis is used, the fuel is commonly sold as low grade ship or "bunker" oil, however it can be refined into higher quality fuels through a refinery.	NA
Carbon black	At the end of the process a carbon residue remains. This can be classified as char, ash or carbon black depending on its quality and the degree to which oxygen has been used in the process. There are global markets for high quality carbon black as a colour pigment in paints and dyes.	NA

Table 5 Tyre-derived products from EFW tyre recycling plants and their common applications

5.2 Primary markets for Australian TDPs

There are several sizable markets for TDPs in Australia and internationally depending on the TDP being produced and sold. Based on national data, the primary markets for TDPs are as follows:



Tyre-derived fuel

Shredded tyres are predominantly used to create TDF. The global market for TDF is significant and is most likely the largest consumer of EOLTs. In Australia, almost 1 in 3 EOLTs are exported for use as TDF.



Road surfacing

Crumb rubber can be used to create superior road seals and asphalt due to its flexible properties. There are strong markets for rubberised sprayed seals for roads in Victoria and NSW with emerging markets in QLD, SA and WA.





Adhesives

Crumb rubber is used in the manufacture of adhesives, particularly tile adhesives, as it provides additional flexibility and reduces the risk of cracking. This is a significant market in Australia with potential for growth.

Playground / soft-fall surfacing

Rubber granule / buffings are used to manufacture soft-fall surfaces which are commonly used on local playgrounds. These can be coloured and "wet-poured" like concrete to take any shape or form.



Matting / underlay

Rubber granule / buffings / crumb can be used to produce recycled rubber matting in many forms, sizes and densities. These can be used as carpet underlay, beneath sports-surfaces and in agricultural markets as flooring.



Civil engineering

Whole tyres can be used in civil engineering applications, including to stabilise subsurface movement and in retaining walls. Internationally, the use of shredded tyres as aggregate (tyre-derived aggregate or TDA) is common as lightweight fill or in landfills.

The estimated market size for TDPs in Australia (based on REC 2017 data) is presented in





5.3 Current market for EOLTs in NT

As noted in the previous section, local recycling of EOLTs in NT is in the order of 2% per annum, with an additional 10% being recovered for export as tyre-derived fuel for international energy markets.

The local tyre recycling industry is restricted to small-scale production of crumb rubber and rubber granules and buffings in Alice Springs, which are produced into rubber mats, cattle mats and soft-fall applications. In addition, there is some shredded tyres for export as TDF coming out of Darwin (via Adelaide). The current market for TDPs in NT is summarised in Figure 9.



Figure 9 Total market for TDPs in NT 2015-16

5.4 Barriers to growth in NT

There are a number of critical barriers that are impacting recovery of EOLTs and growth of markets for TDPs in the NT. Targeting these barriers, which are presented in should be the focus of future interventions by industry and government.

Barrier	Impacts
Regulatory framework	The regulatory framework for EOLTs in NT does not promote recovery and recycling and this remains the critical barrier to current and future recovery models. The landfilling of tyres is cheap and easy, with costs estimated at just \$70/tonne for disposal of shredded tyres. Costs are lower still in regional and remote areas. Allowing whole tyres to be disposed to landfill does not require any value adding to be done which discourages investment in processing infrastructure of any type. Similarly, the absence of a landfill levy means that another economic mechanism is missing, which has traditionally driven greater resource recovery of many waste streams in other jurisdictions.
Transport and consolidation costs	The cost of up front collection and consolidation remains a considerable factor in the EOLT market and this is particularly the case in jurisdictions with long distances between urban centres and low population density, as is the case in NT.



	The remote nature of many regional and rural communities in the NT presents a unique challenge as many communities have limited waste management services and are a considerable distance from an urban centre.
	Tyre retailers in regional areas are likely to generate only modest volumes of material making it hard to encourage tyre recyclers to collect the material, and where easy landfill options exist it is likely that these will be cheaper than collection and transport.
Infrastructure costs	High infrastructure costs for tyre recycling facilities are a barrier, particularly for the production of higher value TDPs such as crumb rubber and rubber granule. Whilst tyre balers can be relatively affordable (in the order of \$30k - \$50k), the various shredders and screens required to make quality crumb and granule are likely to cost in excess of \$1 million for even a modest operation. Maintenance costs can also be significant with industry estimates suggesting costs of up to 30% of the purchase price per annum (particularly for shredders as blade replacement is common).
Imports of crumb rubber	A key barrier facing local recycling of EOLTs in Australia is the import of cheap crumb rubber from international markets. It is reported that crumb can be purchased for around 30% - 50% less than locally manufactured material. Evidence of this was seen in the consultation for this project with reports of soft-fall matting being manufactured in Darwin with imported crumb rather than local products.
Limited local markets for TDPs	At present, the tyre recycling market in the NT is small and has limited visibility. As such there are limited markets for TDPs and for recovery and recycling to be successful in the territory, work will need to be done to support the development of local markets.



6 KEY OPPORTUNITIES FOR IMPROVED RECOVERY OF EOLTs IN NT

This section aims to identify key opportunities to improve recovery of EOLTs in the NT and provide recommendations for moving forward. It is recognised that improving outcomes for waste tyres in the Territory will take action from both government and industry, and this shared responsibility is an essential underpinning in any activities now and in the future.

6.1 Regulation and market based instruments

Opportunity 1: Strengthen the regulatory framework for EOLT management

The viability of EOLT recovery and recycling in NT will be difficult unless changes are made to the regulatory framework that restrict access to landfilling. The most obvious mechanism would be to ban the landfilling of whole tyres or to impose a fee or penalty for landfilling of whole tyres.

This could be implemented in a similar way as has been done in Western Australia, where a "Tyre Landfill Exclusion Zone" has been imposed around the urbanised Greater Perth area but does not extend to regional and rural areas where tyre collection and recycling is not available. Such an approach could be used around Greater Darwin with the ban initially being on whole tyres only, thus encouraging shredding of tyres at the very minimum. In combination, regulations on the transport of whole tyres from metropolitan to regional and rural areas could be considered to reduce leakage of EOLTs into regional landfills.

Whilst there is a valid argument that restricting landfill is only viable where suitable end markets exist, it is unlikely that markets will develop in the absence of tighter regulation. Therefore, a staged implementation approach for the implementation of such regulations should be considered.

Recommendation: It is recommended that NT EPA, working in consultation with tyre retailers, collectors and recyclers, consider implementing tighter regulatory controls on the disposal of tires to landfill in NT.

A potential timeline could include:

2017/18 – Planning, consultation and regulatory impact statement (if required)

2018/19 – Ban is announced with two-year lead time to allow council, industry and consumers to respond

2019/20 – Market development activities underway, new opportunities for TDPs explored

2020/21 – Ban is implemented

Opportunity 2: Implement a levy - refund scheme to encourage recycling

Market based instruments are an effective way of encouraging greater resource recovery, either in consort with strengthened regulatory controls or as stand-alone instruments. Whilst there is an existing mechanism in the market, being the 25 cent levy applied to new tyres by TSA, it is not a levy that is used to directly encourage recycling and it is not applied universally, rather it is voluntary levy paid only by TSA members.

NT could implement a levy – refund scheme for EOLTs. Under such a model, a levy would be applied the point of sale for all new tyres, based on an EPU rate (such as those already in place for TSA). The levy would be a mandated requirement and would be collected by the NT Government and hypothecated into a fund (it is essential that this be the case as the industry would not appreciate a levy that entered consolidated revenue).

The levy would be used to drive recycling and would be returned in the form of a rebate at the point where a tyre has been appropriately recycled by an approved recycler and returned into the productive economy.



Given the market for new tyre sales in NT is relatively constrained, that is there are a small number of players, such a system would be relatively easy to implement. However, these types of schemes may not be well received by retailers of new tyres who may feel the additional cost would reduce overall sales.

The levy would need to be set at a level that would generate a refund high enough to cover collection and recycling activities. In addition, new reporting and auditing requirements would need to be introduced to ensure suitable governance over the process and to ensure the system is not being rorted. Investment in market development activities would be a key underpinning to the scheme, with levy revenue being used to develop standards, specifications and testing, and to support local government and state government procurement.

This model is likely to have the best overall impacts in terms of resource recovery of EOLTs. It not only provides incentive for landfill diversion, but will build strong, local industries for both recycling and uses of waste tyres. In other jurisdictions where such models have been employed, recovery rates commonly exceed 90%.

Recommendation: It is recommended that NT EPA, working in consultation with tyre retailers, collectors and recyclers, investigate a levy – refund scheme for EOLTs in NT to ensure appropriate collection and recycling.

A potential timeline could include:

2017/18 - Planning, consultation and regulatory impact statement (if required)

2018/19 – Guidelines and accreditation program released, auditing and reporting systems launched

2019/20 – Program begins

6.2 Improve conditions for collection, consolidation and recycling

Opportunity 3: Trial new collection and consolidation models to improve economies of scale

The dispersed nature of population in the NT presents a unique challenge. Rural Aboriginal and Torres Strait Islander (ATSI) communities tend to have poor access to services and many do not have waste collection of any type. EOLTs in these communities are strongly linked to the broader issue of end-of-life vehicle waste with stockpiling and dumping commonly seen.

In order for long-term collection and recycling of EOLTs to be viable, new collection and consolidation models will be required. There are several options available for this, including tyre baling and developing regional hubs to aggregate material for tyre collectors.

However, even under these circumstances it will be difficult to generate the type of economic conditions required to make collection and processing viable. Therefore, models that centre not only on material recovery but include a focus on local or disadvantaged employment and training may offer an attractive solution.

Tyre retailers would ideally be involved in the development and execution of a model like this and there is existing interest from the Motor Trades Association NT (MTANT) to trial projects involving ex-corrections inmates who would be trained in vehicle repair and disassembly. There is an opportunity for partnership models with key industry associations to support such an approach, for example MTANT working closely with the Waste and Recycling Industry Association NT (WRINT) and TSA.

Recommendation: It is recommended that new collection and consolidation models for EOLTs in NT be trialled through pilot programs. These models could include elements of local employment and training to improve the overall business case for recovery.

Partnerships between key associations such as TSA, MTANT and WRINT could be a vehicle for trailing such models.



Opportunity 4: Encourage greater participation in TSA across the industry

At present, there 18 TSA accredited tyre retailers out of a market of at least 51 participants, suggesting a participation rate of just 35% or less²¹. There are currently no TSA accredited tyre collectors or recyclers operating in the NT.

Whilst the TSA model is unlikely to have a significant impact on diversion of tyres from landfill in the NT (as it is not a benefit – subsidy scheme), participation has secondary benefits, most notably access to market development funding and industry development support specifically directed at tyre recyclers.

State and local government in the NT, working with MTANT, should be doing more to encourage participation in the scheme for this reason. It is likely that government is a major procurer of new tyres and can use this purchasing power to encourage or mandate participation in the national scheme. In Victoria for instance, changes to the fleet purchasing policy for state government vehicles to mandate TSA accreditation for tyre retailers has had a significant positive impact on participation in the state.

In addition, members of TSA are required to undertake regular reporting of EOLT generation and fates and this information would be extremely useful in tracking progress in the NT.

Recommendation: It is recommended that the NT Government and the Local Government Association of NT, look at how existing procurement policies can be amended to encourage participation in the National Tyre Product Stewardship Scheme as implemented by TSA.

6.3 Develop local markets for TDPs in NT

Opportunity 5: Leverage existing market development work underway nationally

It is good timing for NT to be investigating options for tyre recycling and TDP markets with recent work underway at national level driving significant interest in the sector. In 2015, representatives from industry and government agreed that a national market development strategy should be constructed to encourage a more collaborative approach between states and territories in funding new markets for used tyres.

Development of the strategy is currently being co-led by the Victorian and QLD Governments, with funding from NSW and WA Governments and TSA. The following objectives guide the Strategy:

- support a nationally consistent approach to market development
- increase the usage of tyre-derived products in Australia
- promote greater diversity in tyre-derived products and their application
- facilitate a more cohesive and progressive tyre recycling industry.

There is an opportunity for NT to link into this work and leverage the strategy outcomes. New opportunities have been identified and will be progressed over coming years. Where feasible, NT can look to implement the findings of the strategy and generate new markets for EOLTs.

Recommendation: It is recommended that the NT Government look to align key objectives and opportunities for TDPs with the current national market development strategy which is underway. This will be led through discussions at the Meeting of Environment Ministers (MEM) in June 2017 and NT can look to position itself at this stage.

²¹ There are 51 listed tyre retailers in the Northern Territory, however this does not include smaller garages and mechanics changing tyres and the 35% estimated participation rate is likely to therefore be an overestimate.



Opportunity 6: Develop new, local markets for TDPs in NT

In line with the national market development strategy, there are several opportunities for new markets for TDPs in the NT which should be pursued. Whilst higher end uses should be preferenced, the limited capacity to produce crumb and granule at scale in NT suggests that a range of options for TDPs should be considered. Therefore, the following new and expanded markets should be prioritised:

- Tyre derived aggregate (TDA) in landfill management and as lightweight fill A push to ban whole tyres
 from landfill would naturally drive the market toward shredding tyres. Whilst TDF exports are likely to be
 an obvious outlet for this material, the use of TDA in civil engineering applications offers considerable
 opportunity. Whilst some testing and changes to regulation may be required, use of shredded tyres in
 landfills as either drainage aggregate or daily cover could offer an immediate short term market
 opportunity.
- Use of whole tyres in civil engineering Whilst the uncontrolled use of whole tyres in civil engineering is
 not advised (for example, using loose tyres for erosion control), there are technical systems that use tyres
 in development of retaining walls and barriers and as subbase stabilisation. The EcoFlex system (NSW)
 and C4M system (WA) are good examples of market ready solutions that could be used in NT.
- Use of crumb rubber in sprayed seals Road surfacing is the largest national market for TDPs with high uptake in Victoria and NSW in particular. There is scope for NT to leverage recent work undertaken in QLD to test and then develop new specifications to use rubber modified sprayed seals. Consultation undertaken for this project indicated a preference for other modified binders in road construction in NT, based on recent investment in styrene-butadiene styrene (SBS) binders. However, this could be complemented by rubber modified binders in some applications, for example where high strength seals are required.
- Soft-fall surfacing and matting The fact that TDPs such as soft fall surfacing and matting are being manufactured in NT, even if at small volumes, suggests there is a considerable opportunity to grow this market.

There are two key factors that will influence the development of these markets:

- 1. Product standards and specifications Standards and specifications need to exist that facilitate the use of TDPs and allow and even playing field with competitor products.
- Government procurement The role of local and state government procurement in the development of markets for recycled products cannot be underestimated. Government procurement policies should promote recycled content material where price and quality are the equal to or better than virgin materials.

Recommendation: It is recommended that the NT Government, working closely with industry, pursue new markets for TDPs in the territory, and support the development of standards and specifications for new uses (for instance as landfill drainage aggregate or daily cover). Similarly, both NT Government and Local Government Association of NT, should look to promote the use of locally manufactured TDPs in applications where they are equal on price, performance and quality.